SUPPLEMENT TO

THE

MYSORE GAZETTE.

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Published by Authority.

BANGALORE, SATURDAY 1ST JUNE 1867.

MISCELLANEOUS PAPERS.

CIRCULAR NO. 10 FOREST.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

REVENUE—FORESTS.

FORT WILLIAM, APRIL 23, 1867.

Selection of young men to be trained in Europe for Forest Service in India.

Read again:—

Public Works Department Circular No. 6F, dated 11th April 1867.

Read also—

No. 8, dated 28th February, 1867.

From

Secretary of State for India.

To

The Government of India.

In continuation of my Despatches of the 31st October, No. 63, and the 15th December, No. 81 of 1866, I have to inform your Excellency in Council that the selection of the young men to be trained on the Continent for Forest service in India has been made by me, after the production of the requisite certificates by the candidates, and their examination, conducted partly by Dr. Brandis, Inspector General of the Forests under your charge, and partly by the Civil Service Commissioners, with a view to ascertain the qualifications of the several applicants.

2. These examinations, as well as that by the Medical Board, were dispensed with in only one instance, that of Mr. Louis Gavin, the son of a deceased British soldier, who served through the latter part of the Indian mutiny, and died as a Sergeant-Instructor of Musketry in Her Majesty's 71st Highlanders at Gwalior in 1860. This young man resided at Nancy, in France, where he had been brought up, and whilst his physical capacity was shown by a medical certificate, his qualifications and character were vouched for by Monsieur Nanquette, the Director-General of the Forest School at Nancy, under whom all the young men sent to France will be placed, and who has most obligingly assisted the views of Her Majesty's Government in concerting with Dr. Brandis the necessary arrangements relating to this experiment. I therefore added him to the list of selected candidates, the other four being those who had shown themselves best qualified by their knowledge of the subjects required.

Walter Henman, aged 17.

Alfred Pengelly, aged 23.

Edward McArthur Moir, aged 18; and,

Framjee Rustamjee Dasai, aged 20; son of a Merchant at Bombay.

These four, together with Louis Gavin, aged 18, have been directed to report themselves to Monsieur Laydeker, Directeur Général des Forets at Paris, on the 1st of March, to receive instructions for the commencement of their training.

3. I transmit herewith a copy of the *Réglement* for this purpose agreed upon by Monsieur Laydeker and Dr. Brandis, and approved by me in Council.

4. As these five young men were not, from their want of knowledge of the German language, qualified for training at Hanover; and as it seemed to me important that the experiment should be tried by the employment of men educated in Fo-

restry in Germany as well as in France, I determined to select from the list of candidates who had passed the examinations, two more, and have nominated John Kipper Hume, aged 20, and Albert Edward Wild, aged 20, who have been instructed to proceed to Hanover by the 1st of March, and report themselves to Forest Director Burkchardt, who has undertaken the charge of training them.

5. You will, I hope, therefore receive seven persons well trained for service in the Forest Department at the end of 1869, or the beginning of 1870.

6. I shall await your reply to my Despatch of the 31st of October last before taking any further step in this direction, but I transmit to you, by this opportunity, 30 printed copies of a further letter which Dr. Brandis addressed to this Department before his departure, and which contains his opinion as to the changes which should be made in the course pursued this year, should it be deemed expedient to renew the experiment another year.

13th February 1867.

7. I shall transmit a copy of this Despatch to the Governors in Council at Madras and Bombay, and shall be ready to consider any application which they may make through you for the services of any young men trained in this way for the Forest Department of their respective Presidencies.

8. With reference to the studies of Forest officers on leave to Europe, I transmit to you a copy of the *Réglement* settled between Monsieur Laydeker and Dr. Brandis on this subject, and also 30 copies of a letter from Dr. Brandis detailing the arrangements which he has made with the Forest authorities in Germany.

13th February 1867.

9. I cannot conclude this Despatch without expressing to your Excellency in Council, the high sense which I entertain of the zeal, energy and ability displayed by Dr. Brandis in his exertions to place these arrangements on a satisfactory basis.

Dated 13th February 1867.

From

Dr. D. Brandis, Inspector General of Forests.

To

Under Secretary of State for India.

I have now the honor to report, for the approval of her Majesty's Secretary of State for India, the arrangements which I have made in Germany to facilitate the studies of those Forest Officers on leave who may desire to pass through a course of instruction in Forestry in that Country.

2. The following gentlemen have promised me their co-operation in this matter; they have stated their readiness to furnish all information and assistance in their power to Forest Officers on leave in their studies.

1. Herr von Mantel, Chief of the Forest Department in Bavaria.
2. Herr Forst Director Burckhardt, Hanover.
3. Herr Director Judeich, Principal of the Forest School at Tharant.
4. The Administration of the Estates of the Prince of Fürstenberg, through their chief Forest Officer, Oberforstrath Roth, at Donaueschingen.

I would suggest that Forest Officers on leave, proceeding to Germany for their studies, should receive a circular letter of introduction addressed to the above. This letter might contain a request to grant them certificates at the close of their course of instruction. I would also suggest a letter of thanks to these gentlemen, as soon as opportunity offers.

3. In the memorandum annexed, I have detailed the course which might most conveniently be pursued by Forest Officers proceeding to Germany. As we have in this instance to deal with the administration of Forests in several distinct countries, personal changes by death, or removal, may from time to time necessitate changes in this memorandum of instructions. To obviate as much as possible any inconvenience that may arise from such changes, I have made the following arrangements:— My youngest brother, Herr Carl Brandis, Oberleimbachshof bei Hürfeld, Provinz Hessen, Prussia, has kindly undertaken to give every advice to Forest Officers on leave, while prosecuting their studies in Germany. They should write to him in case there is any need for his assistance. As he is personally acquainted with many of the principal Forest Officers in Germany, and has a considerable knowledge of Forest management in many parts of Germany, his advice may be followed with advantage. I may take this opportunity of stating that, should it hereafter be found desirable to send out to India another experienced Forest officer from Germany, my brother, with the assistance of the gentlemen named above, will be in a position to recommend good men. I have furnished him (privately) with copies of all documents relating to the instruction

of Forest Officers on leave, and of young men destined for the Forest Department.

4. I beg now to offer my suggestions regarding the subjects which Forest officers on leave might be recommended to study in Great Britain. They are as follows:—

1st. One month with an approved Wood Manager in Scotland during the time when most planting work is going on. The best time would be early spring. I am inclined to recommend their spending the time with Mr. M'Corquodale, Wood Manager to the Earl of Mansfield, Scone, near Perth, one of the most experienced and skilful Foresters in Scotland, whose acquaintance I have had the privilege of making. The fees which Mr. M. Corquodale receives from pupils for studying Forestry, I understand to be £5 per mensem.

2nd. A week at the great Forest nursery of Messrs Peter Lawson and Sons, near Edinburgh, to learn nursery and transplanting work. Messrs. Lawson have expressed to me, in the most liberal manner, their readiness to assist Forest Officers on leave introduced to them by a few lines from the India Office. There will be no remuneration in this instance.

3rd. A practical and theoretical course with a competent Land Surveyor.

4th. A week or more at the Woolwich, or at any other Dockyard, to study the different kinds and description of timber used for ship-building, the methods used for seasoning and preserving them, and generally the appropriation of timbers to the construction of vessels. I specially mention the Dockyard at Woolwich, because I have had the privilege, on a visit which I paid to that Establishment, with the permission of the Naval authorities, in July 1865, to make the acquaintance of Mr. Thomas Laslett, the Timber Inspector at that Dockyard, an officer of great experience and most extensive knowledge in timber matters, whose assistance would be of great value to Forest Officers. The permission of the Lords Commissioners of the Admiralty would be requisite. In France, a number of young Forest Officers are from time to time sent to Cherbourg for similar studies.

Should the plan of training young men for the Forest service in India be carried out, they might, after completing all their studies, spend a fortnight at Woolwich with much advantage to their future career in India.

5. Forest officers who have not had opportunities of studying Natural Sciences before, might employ their sojourn in England in the most useful manner by attending lectures on the following subjects, at any University or College, or at the School of Mines in London:—

1st. Botany.
2nd. Chemistry.
3rd. Natural Philosophy.
4th. Geology.
5th. Natural History, (Zoology)

5th. In conclusion, I beg to observe that the time at the disposal of Forest Officers on leave may rarely enable them to attend to all the subjects enumerated here; but there may be many, who are not inclined to prosecute their studies in the Continent, and who may wish to employ their time in this country as usefully as possible.

I would respectfully suggest that this letter, and the memorandum appended hereto, be printed, to be comunicated to Forest Officers on leave, who may report themselves at this office. The programme for their studies in France has already been lithographed.

Memorandum for the guidance of Forest Officers on leave in Europe, who may go to Germany to pass through a course of instruction in Forestry.

The most useful arrangement would be for Forest Officers on leave to commence by devoting one or two months to a practical course of training under an experienced Forest Officer, and afterwards to spend one half-yearly term at one of the two Forest Schools mentioned below.

2. M. Burckhardt, Director of the Forests in the former kingdom of Hanover, has kindly undertaken to make the necessary arrangements for this preliminary practical course, which will probably be in a mixed beech and oak forest, and might

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with great advantage be extended to three months. While thus engaged, Forest Officers are specially recommended to make themselves acquainted with all sub-divisions of one working Division (Wirthschaft's complex.) They should study the documents relating to the working plan (Wirthschaft's plan), and take a copy of the map of that portion of the forests, as well as of the more important parts of those documents. The careful examination of certain sub-divisions is specially recommended:—

1.—A series of sub-divisions representing the different ages of the forest.

2.—Sub-divisions of different ages where thinning operations are to be carried on, or have been carried on.

3.—Sub-divisions of mature age on different kinds of soil. Forest Officers should seek opportunities to make themselves practically acquainted with the method of valuation surveys (Massenaufnahmen) in forests of mature age. They should seek to acquire some practice in estimating the cubical contents of timber standing on a "Morgen" in mature forest of different quality as to soil and growth of timber.

4.—Sub-divisions of mature age, where felling operations have been commenced, or are to be commenced.

5.—Sub-divisions where the intermediate felling operations are being carried on (Besamungsschlag Lichtschlag). The process of natural regeneration should be studied, and the greater or less success of it under different circumstances.

6.—Sub-divisions where the last cutting is taking place.

7.—Localities where planting or sowing operations are going on to aid natural re-production.

8.—All operations to further the growth of the Oak at the expense of the Beech.

In this study, the aim of Forest Officers should be to make themselves acquainted with the leading principles in the preparation of working plans of these forests, the method of obtaining the fundamental data for the same, and the determination of the quantity that may annually be cut in the forest.

This will be the main object of the preliminary practical course; there will, however, be opportunities, if time is left, to study the management of these forests generally.

3. The two Forest Schools recommended for continuation of the studies of officers, are at Tharant, near Dresden, and at Aschaffenburg in Bavaria. Director Burckhardt's advice should be taken as to which of the two should be chosen. The regular course of studies at Tharant requires two years, and at Aschaffenburk two years and a half. The Director of the School in Saxony is Forstrath Judeich; he has declared himself ready personally to assist British Forest Officers on leave in their studies, to indicate to them those public lectures which they should attend, and to arrange for private instruction, if such should be found necessary. The summer term at Tharant commences about the beginning of April, and closes early in August. The winter term begins on the 15th October, and lasts about five months.

At Aschaffenburg there is also a summer and winter term, and similar facilities will be afforded there to Forest Officers on leave as at Tharant.

The principal object of a half year's sojourn at one of these Forest Schools is to obtain a connected knowledge of the principal branches of Forestry, including the administration of, and legislation for, forests. For those who wish at the same time to advance their studies of natural sciences, or of applied mathematics, ample opportunities are afforded, both at Aschaffenburg and at Tharant.

4. After completing the studies here sketched, it will then be desirable to visit certain forest districts in other parts of Germany, to see other kinds of forests, and to become familiar with their mode of management.

Two forest districts are specially recommended here, but there are many others which might be usefully added; some of them will be enumerated below.

I. Forstrevier Rothenbuch, in the Spessart, near Aschaffenburg, Bavaria.—Beech and Oak. Improvement of the pure Oak forest by planting an underwood of Beech. Improvement of impoverished soil by the fir and pine plantations. Road-making. Study of the prescriptive rights, with which this forest is still burdened.

The different Districts of the Spessart, which is one of the most extensive forests of middle Germany, are interesting in many respects. The soil (red sand-stone) is generally poor, yet there are to be found in the forest the largest and finest Oak trees in Europe, not isolated, but in large masses.

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For various reasons the system of management here pursued is highly conservative, the quantity fixed to be cut annually is far below the amount produced. The re-production of the forest is mainly by natural means, but aided by careful cultivation wherever necessary. The extensive plantations of coniferous trees (spruce, Scotch fir, larch) on the outskirts of the forest, where it had been deteriorated by the encroachments of the surrounding villages, are most instructive, and should be carefully studied.

II. Forstrevier Rippoldsau, Grand Duchy of Baden. This district, which is situated in the Black Forest, on the head-waters of one of the feeders of the Kinzig river, forms part of the extensive forests belonging to Prince Fürstenberg. The Chief Forest Officer on the estates of this nobleman, Oberforstrath Roth, is one of the most eminent Forest Officers in Germany; the district named is at present in charge of Forstverwalter Ganter, who has been instructed by the "Furstliche Domainen Kanzley" (Office for the Administration of the Prince's Estates) to afford all facility and assistance to Forest Officers from India for studying the management of the forests under his care.

Spruce and silver fir, with Scotch fir on dry warm slopes towards the south, are the principal kinds of trees here. Natural re-production is mainly relied upon, aided by planting wherever needful. The plantations of spruce on the high marshy plateau of the kniebis might be visited.

The period between the first and last cutting in a mature forest here is usually extended to 30 years, much longer than is the case in other high timber forests. The gradual selection of the trees to be felled is instructive.

Although the forest is often disturbed during the first time of growth of the young crop, yet the thicket is complete. The thinning operations are here carried on with particular care, the poles being valuable for the hop gardens of the Rhine Valley.

The operation of felling, moving the timber to the roads, and sliding it down these roads, in winter, should be studied. The roads are narrow, and constructed with skill and great economy.

The floating operations down several tributaries of the Kinzig, Enz, and other rivers in the Black Forest, are extremely instructive.

The general management of the Rippoldsau Forest is much less conservative than that of most of the Bavarian State forests; nevertheless, the maintenance of the forest in a high state of productiveness is fully assured, and at the same time the highest possible revenue is drawn from it.

The administration of these private forests is very economical and efficient.

In the working plan, great stress is laid on the careful and intelligent treatment of each sub-division, according to its own peculiar requirements. The study of the documents composing the "Betriebs einrichtungsplan" is strongly recommended; the careful description of each sub-division, with a statement of what has been done in it during the last ten years, and what has to be done during the ten years following may be taken as a pattern. The last decennial rivision of this working plan took place in September 1865.

By way of comparison, it would be instructive to visit some of the adjoining districts of the Black Forest belonging to the State Forests of the Grand Duchy of Baden, and of the kingdom of Würtemburg. The system of selecting single trees to be felled (Plänter Wirthschaft), has been adopted and carried out with success in some of the private forests in the Valley of the Murg, which might be visited.

The timber trade, which annually draws immense quantities of large descriptions of timber from the different valleys of the Schwarzwald, may be studied, if there should be time for a prolonged stay in those parts.

5. The following is a list of Forest Districts, which might with much advantage be visited. They have been selected in Bavaria, because all the branches of Forest Administration are in a high state of efficiency in that country.

1.—Kranzberg, between München and Freysing. Spruce, silver fir, and Scotch fir.

2.—Bamberg. The forest is called the Haupts Moor, and is remarkable for its splendid Scotch fir, on poor sandy soil.

3.—Frankenwald and Baierische Wald,—for road-making and the improvement of rivers for floating.

6. Forest Officers on leave, intending to proceed to Germany for their studies, will receive a circular letter of introduction to the following gentleman.

1.—Herr van Mantel, München, Königlich Bayerischer Ministerialrath (Chief of the Bavarian State, Forest Department.)

2.—Herr Burckhardt, Hanover, Königlich Preussischer Forst Director (Director of the State Forest in the former Kingdom of Hanover.)

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3.—Herr Director Judeich, Tharant, Königlich Sächsischer Forstrath.

4.—Furstliche Domainen, Kanzlei, Donaueschingen (Administration of the estates of the Prince of Fürstenberg.)

Forest Officers would do well, in the first instance, to proceed to Hanover; they should write beforehand, as early as possible, to announce their arrival, enclosing a copy of the circular letter of introduction, and asking for a reply, which might await their arrival at Cologne (*Poste Restante*). In this letter they might state the time which they would be able to devote to their studies in Germany.

After arranging their plans in a general way with Forst Director Burckhardt, they should then write to announce their arrival at the Forest School that may be selected. If Aschaffenburg is chosen, it would be well to write to Herr von Mantal, at München, asking for his instructions and letters of introduction.

From the Forest School they would then make the other arrangements in a similar manner.

The most convenient arrangement would be to commence, early in spring, to attend the summer term of one of the Forest Schools, and to return to England about Christmas.

7. The following books should be procured and studied:—

1.—"Das Baierische Forstgesetz."

2.—"Die Baierische Forstverwaltung."

Director Burckhardt, or others of the gentlemen named above, will recommend, in addition to these, works on the cultivation of forests, and on working plans (Betriebslehre). The literature of Forestry in Germany is so rich, and new and excellent works so constantly appear, that it is better to leave the choice open until they are wanted.

Forest Officers on leave are strongly recommended to enter in a diary book their occupations and the result of their observations, and, besides, to draw up, for their own reference hereafter, reports on the rules and principles of management followed in the different forest districts visited by them.

Dated 13th February 1867.

From—Dr. D. Brandis, Inspector General of Forests.

To—Under Secretary of State for India.

I have the honor once more to address you on the selection of candidates for service in the forests of India, and their professional training before they are sent out: It appears to me that, in case it should hereafter be decided to repeat the experiment which has this year been made, it may be useful to have a statement of the plan proposed for the selection and training of the candidates, with those modifications which the experience of this year's selection seems to render desirable or expedient.

2. In the original proposal, which was embodied in my letter to the Secretary to the Government of India of the 24th September, the plan for training was sketched as follows:—

1st.—One year and a half to be employed in the study of natural sciences at any of the Universities of Great Britain.

2nd.—A practical and theoretical course of land surveying.

3rd.—Two months' apprenticeship with an approved Forester or Wood-Manager in Scotland.

4th.—One year with an approved Forest Officer either in Germany or in France.

3. This course of training pre-supposed, as a necessary condition, that the candidate had received a good general education, specially in Mathematics. In that letter I suggested that candidates should merely register certificates of having gone through the course of studies indicated above, and, after completing their training, go out to India at their own expense, taking their chance of any appointments that might be offered them in one of the Forest Departments of the different Provinces.

4. On further consideration it was, however, found that this plan offered considerable difficulties in its execution, and but little chance of success.

When it was, therefore, determined to test the proposal by an experiment to be made this year, a more simple and compact plan was suggested, which was detailed in my letter of the 6th October, and the main points of which having been adopted by Her Majesty's Secretary of State, were embodied in a paper circulated from the India Office, headed,—"Particulars respecting the selection of candidates for nomination to junior appointments in the Forest Department in India."

The standard for admission comprised proficiency in the following subjects:—

1.—English writing and composition.

2.—Elementary mathematics, including Plane Trigonometry.

3:—Either German or French,—
with two subjects not obligatory, but which should entitle candidates proficient in them to preference—
1.—Chemistry and Physics.
2.—Free hand and plan drawing.

5.—Candidates selected are to be sent either to Germany or France for their professional education, which will comprise the following subjects:—
1.—The science and practice of Forestry.
2.—Surveying, road-making, and the elements of engineering, as far as required for the duties of a Forest Officer.
3.—Certain branches of jurisprudence which have reference to forest legislation, and administration of forests.
4.—Certain branches of the natural sciences which are of particular importance to the forester, —botany, entomology, chemistry, physics, geology.

The practical part of these studies is to be accomplished by an apprenticeship under an experienced Forest Officer, and the theoretical part should be studied either at one of the Public Forest schools of the continent, or under professors specially engaged for the purpose.

6. By this arrangement, the selection of the candidates was made before their commencing their professional studies. The instruction furnished by every good school in Great Britain would ensure a proficiency in the subjects required for their admission. It could not be objected that young men were led to commence a special line of study at a venture, and without the certainty of obtaining employment in the line chosen by them.

7. Nor can any objection be made to the plan as proposed for this year, on account of the efficiency of the training to be attained. The profession of Forest Officer being an important one in Germany and France, excellent public schools or colleges have been established in every State (some for more than 50 years) for the professional training of these men. At these schools, the different branches of science mentioned above are taught by eminent professors. The fact also of the English students attending the lectures, and going through the practical exercises, and the periodical examinations, in company with a large number of French students preparing for the same profession, may be thought to have some importance. The scheme of instruction framed for our students in Germany, by regular apprenticeship and private instruction under the immediate supervision of some of the first Forest Officers of the country, would offer even greater advantages, and greater certainty of satisfactory results.

8. There would not, therefore, be any reason for considering any alteration of this plan, had it not been publicly attacked in strong terms. The principal attack has been made by Professor Balfour of the Edinburgh University, Director of the Royal Botanic Gardens. He communicated his remarks at a meeting of the Botanical Society of Edinburgh, on the 13th December, and they were reprinted in the *Farmer* of the 26th December 1866. They are as follows:—

Managers for Indian Forests:—Dr. Balfour laid before the Society a document which had been sent from the India House, relative to the preparation of young men for the forest Department in India. Dr. Balfour considered that it was most important to train up young men for this Department, but he saw no reason why they should be compelled to study Forestry in Germany and France, and not be allowed to prosecute their studies in this country. He was satisfied that ample opportunities were presented in Britain for the acquisition of knowledge in all departments of science requisite for forest work, as well as in practical operations. There are many excellent Foresters in Britain, who would train young men, and there are excellent nurseries in which the treatment of Cinchona could be well studied. He hoped that the Secretary of State for India would see the propriety of not confining the studies to Germany and France, to the exclusion of Britain. Let young men study where they choose, but let them be carefully examined as to their scientific knowledge and their practical information. If the examination was conducted in a garden, means would be at hand for carrying it on in such a way as at once to bring out the capabilities of the candidates. By leaving the place of study open to candidates, the Government would also be saved expense in the matter. Any who choose to study on the Continent might go there. The German and French languages are not absolutely essential for the

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Indian Forest Department. It would be better that the candidate should be instructed in Hindustanee, or in some of the Indian dialects, and this could be well done in any seat of learning in Britain. Botany, Chemistry, Natural History, along with practical work in a botanical garden or nursery, could be well prosecuted in Britain."

9. The most important sentence in these remarks is that in which Professor Balfour declares himself "satisfied that ample opportunities were presented in Britain for the acquisition of knowledge in all departments of science requisite for forest work, as well as in practical operations."

If this passage is intended to refer to mathematics, the natural sciences, surveying, it undoubtedly is correct. For the study of these sciences it would be neither necessary nor desirable to seek for opportunities outside of Great Britain.

These, however, are the auxiliary sciences only. The subject of study in the forest schools of France and Germany is the science and practice of forestry, *viz.*, the culture, management, and working of the forests, and all that is connected with the administration of forests and forest legislation.

10. I believe I am correct in stating that, for the study of these subjects, sufficient opportunities are not presented in Great Britain, whereas the opportunities afforded in the State forests, at the public forest schools, or by private tuition under eminent Forest Officers in Germany or France, are excellent.

I spent a considerable time last year, and the year before last, in examining a large number of wood-lands and plantations in England and Scotland, and have become personally acquainted with a large number of foresters. I have also visited some of the Crown forests in England, and I desire here to state that I have seen many plantations of high timber forest as well as of coppice wood, which had been established with great skill and success, and were under excellent management.

11. But upon the whole the wood-lands in Great Britain are on a much smaller scale than either in France or Germany, and, consequently, the management and administration of forests on a large scale is not so fully developed here as on the Continent, where forestry is recognized as one of the scientific professions, the principles and rules of which are based upon the most careful researches, and are illustrated and explained in a large number of scientific works, which form a large branch of the professional literature of those countries. I may add that, in German and French, there are no less than eight important monthly papers which are exclusively devoted to forestry, not counting a number of smaller periodical publications of the same character.

The State forests of France alone cover an area of 2,706,000 acres with a gross revenue of £ 1,740,600, upon which the charges amount to £ 494,320; those of Bavaria cover 1,962,000 acres, and those of Prussia, before the late war, 5,075,000 acres.

12. Again, there are important differences in the general system of management, and upon the whole it may be said that the system which should be followed in many Provinces of India approaches more the method which has gradually developed itself in Germany and France, and which in those countries has been brought to a high state of perfection. Without entering into details, which could not be exhausted in this paper, I may state that, on the Continent of Europe, natural reproduction of the forest is the rule, not of coppice woods only, but also of high timber forest. The main point looked to in the management of a high timber forest in those countries is, so to arrange the cutting and felling as to secure the ground being covered with a crop of self-sown trees before the old crop is entirely removed. This requires a careful and methodical management. In Scotland and England, with the exception of coppice woods, and a limited extent of natural forest of Scotch fir in the Highlands, the system generally followed is to cut down the mature crops and to plant.

In a large portion of the Indian forests natural reproduction will have to be relied upon for the maintenance of the forest, planting operations being carried on, as in France and Germany, where the old forest has disappeared, or has been injured, so as to give us no hope of a satisfactory natural reproduction. Under similar circumstances, and on barren wastes, planting operations are carried on in Germany and France with great skill and success on a very large scale, and with great economy.

Upon the whole, an intimate acquaintance with the system and practice of forestry in Germany and France is, in my opinion, a matter of the first importance for the successful management of a large portion of the forests in India.

(*To be continued.*)